TWO RIVERS ACCLIMATION SITE
PRELIMINARY DESIGN REPORT

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for
Yakama Nation
05/28/2002

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I. INTRODUCTION

The Two Rivers site is proposed as a release location for 160,000 to 200,000 coho smolts. The project will be in support of the feasibility phase of the Mid-Columbia Coho Restoration Program (CRP) whose goal is to restore naturally spawning populations to the Wenatchee, Entiat, and Methow watersheds.

The CRP utilizes coho pre-smolts that are reared in lower Columbia River hatcheries. These fish are trucked to acclimation sites in the region for additional rearing and release. They are delivered in mid-March and are held in natural acclimation facilities for approximately 6 weeks. During this period fish are fed and fish screens and nets that are used to confine the fish are cleaned daily. At the end of the acclimation period, the

barriers are removed and smolts exit the ponds volitionally. There were 4 sites in operation in the spring of 2002 and another 4 are planned to be added by the spring of 2003 in the Wenatchee watershed.

One of the 2003 sites is proposed for the Little Wenatchee River. Since adult salmon return to their point of release to spawn, acclimation sites need to be used that are located in appropriate spawning and rearing habitat. The Two Rivers site meets the criteria for a site in the Little Wenatchee watershed.

Acclimation ponds are proposed for a location in an active gravel mine, operated by Two Rivers, Inc. The land where the ponds will be constructed is currently cleared and identified as an area for future gravel removal. Environmental impacts are reduced by constructing the site on disturbed ground, however, several construction and operating permits will be required. The acclimation facility will be allowed to function at this location until the property owners decide to mine the site or sell the property.

Ponds will be formed from the gravel and silt material on the site. They will have steel water outlet structures and will be lined. Two ponds will be built to provide program flexibility and to allow separation of test groups.

An infiltration gallery or a well will be constructed to supply water to the ponds. The design of the system will be determined after hydrogeologic evaluations have been completed. Submersible, axial flow pumps will provide water delivery. The pumps will be powered by dual generators with automatic transfer switches and power failure alarm systems.

Discharge of water and fish will be through a pipeline that will extend through the existing berm. It will connect to the existing discharge channel draining the gravel mine.

Space and water requirement calculations for the acclimation facility are presented below:

Pond Capacity				
	Number of fish:	160,000		
	Size of coho released:	15 /lb.		
	Pounds released:	10,667 lbs.		
	Volume density criteria:	0.3 lb./cubic ft.		
	Water volume:	35,556 cubic ft.		
	Average depth:	3.5 ft.		
	Surface area:	10,159 sq. ft.	=	0.23 acre
Water Requirements				
	Flow density criteria:	10 lbs/gpm		
	Water needed:	1067 gpm	=	2.4 cfs

Site information follows:

Land Owner: Two Rivers, Inc.
7934 East Leavenworth Road
Leavenworth, WA 98826

Location: SW 1/4 of Section 15, T 27N, R16 E, Chelan County

Driving Directions: Go south 1 mile on the Little Wenatchee River road, turn left into the Two Rivers gravel pit.

Zoning: RR 20 – Rural residential with 20 acre minimum lot size.

Legal Description:

West half of the northeast quarter; northeast quarter of the northwest quarter, east of White River; north half of the southeast quarter; southeast quarter of the southeast quarter; east half of the southwest quarter of the southeast quarter; north half of the northwest quarter of the southwest quarter of the southeast quarter of Section 9; northeast quarter of the northeast quarter; that portion of the northwest quarter of the northeast quarter lying northeast of a line from the northwest corner to the southeast corner of the northeast quarter of Section 15; except that portion thereof conveyed to Chelan County, Washington, for road, by deed recorded May 4, 1921, Volume 160, Page 107. South half of the northeast quarter; northwest quarter of the northwest quarter; south half of the northwest quarter; southwest quarter; west half of the southeast quarter, Section 15; east half of the northeast quarter of the northeast quarter; northwest quarter of the northeast quarter of the northeast quarter of Section 16; northwest quarter of the northeast quarter; north half of the southwest quarter of the northeast quarter; Government Lot 2; southeast quarter of the northeast quarter of the northeast quarter of the northwest quarter; east half of the southeast quarter of the northeast quarter of the northwest quarter; northeast quarter of the northeast quarter of the southeast quarter of the northwest quarter, Section 27, all in Township 27 North, Range 16, east of the Willamette Meridian.

II. OPERATING PLAN

The following section from the draft HGMP (HATCHERY AND GENETICS MANAGEMENT PLAN MID-COLUMBIA COHO REINTRODUCTION PROGRAM, Dec, 1999, Yakama Nation, WDFW, BPA) describes the operating plan for acclimation sites in the program. The Two Rivers facility will be managed under these guidelines. This site will involve more labor than other, more "natural" sites. The pumped water supply and power generators will require continuous alarm monitoring and stand-by support personnel.

SECTION 9. RELEASE

9.1) Life history stage, size, and age at release. Yearling smolts, between 75 and 122 mm fork length.

9.2) Life history stage, size and age of natural fish of same species in release area at time of release. There are no natural fish of the same species in the mid-Columbia region. Monitoring of differences in hatchery bred fish and naturally reproduced fish will begin when sufficient numbers of naturalized fish begin to appear. For this plan, a diminishing portion of all smolt releases would include Lower River coho smolts. It is expected that the numbers of adults returning to mid-Columbia basins will limit the numbers of their progeny, so that smolt releases in the Methow basin will continue to rely on Lower River smolts for the period of this plan. (See Table 1, section 1.9 and section 5.)

9.3) Dates of release and release protocols: Volitional releases, April 25 - May 30.

9.4) Location(s) of release: See Table 1, section 1.9.

9.5) Acclimation procedures. Coho smolts would be acclimated away from the hatchery whenever possible, exposed to a semi-natural rearing environment to condition them for the natural environment. Juvenile coho are typically acclimated for 4-6 weeks prior to liberation, but depending on experimental objectives, could be acclimated from 2 to 8 weeks. During that period, fish culturists periodically feed the pre-smolts a predetermined amount of fish food pellets. This amount is calculated based on number and size of fish, and on water temperature. Typical fish culture activities include net maintenance, pond cleaning (if applicable), mortality assessments, and growth and fish health measurements.

9.6) Number of fish released. See Table 1, section 1.9.

9.7) Marks used to identify hatchery adults. During the initial period of the feasibility phase of the program, adult returns of naturalized fish are expected to be low. As the program progresses and the abundance of naturalized coho increases, the program will mark hatchery fish with coded wire tags. See section 10.1.

9.8) Unknowns. Continued monitoring and evaluation of risks to other species (particularly listed species), survival, and brood stock requirements, could result in modification of currently proposed release numbers or locations.

III. CONSTRUCTION PLAN

The first step in the construction of the site will be a water supply study, directed by a groundwater consulting firm. Test pits or wells will be constructed to evaluate the potential yield from an infiltration gallery or shallow wells. Test pumping studies will be conducted to determine ground water yield. A general water supply design will be produced from the studies, followed by a final design which will detail gallery/well design, and pump, pipe, and generator sizes.

Next, the Two Rivers gravel pit flood control berm will be extended along the northwest edge of the acclimation site. There is currently a low berm in this area that was formed when the discharge channel was excavated. It allows flood waters to enter the site. This will be raised to the same elevation as the remainder of the berm which now parallels the Little Wenatchee River. This new berm section will serve as part of the access road to the acclimation site and will be surfaced with gravel when completed.

To make the ponds operational during floods, a large volume of material will be needed to raise the site. A flood study has not been performed, actual water elevations at the gravel pit from the 1996 flood are used as a design level (the 50 year flood elevation of 1882' for the predicted by the 1979 EIS for the Two Rivers Gravel Operation is low). The attached crossectional drawings show the elevations. The ponds, generator pad and storage building areas will be raised, requiring approximately 5,000 cubic yards of material.

After the elevation fill has been moved to the site, the ponds will be formed by bulldozer, front-end loader, and backhoe. Preconstructed, steel outlet structures will hold the dam board water elevation controls and fish screens. The bottom surfaces will be compacted, surfaced with a 3 inch sand layer, and will be covered with Hypalon rubber liners. Water will be supplied to the pond through pipeline headers. A discharge pipe will extend from the pond outlets to the existing discharge channel. The PVC pipe will have large radius sweeps at all bends to minimize damage to smolts during release.

Two generators will be required to operate the water pumps. Fuel storage tanks with a minimum capacity of 2 weeks will be installed and will meet secondary containment requirements. An automatic transfer switch will start the back-up generator if the primary unit fails. An alarm system will notify personnel in the event of a water supply failure.

A 12 ft by 12ft, pre-fabricated steel shed will be used to store feed and equipment. Fencing will surround the site and predator nets will cover the ponds. Vehicle access will be along an existing, undeveloped road through the Two Rivers site. It will be improved where needed with gravel surfacing.

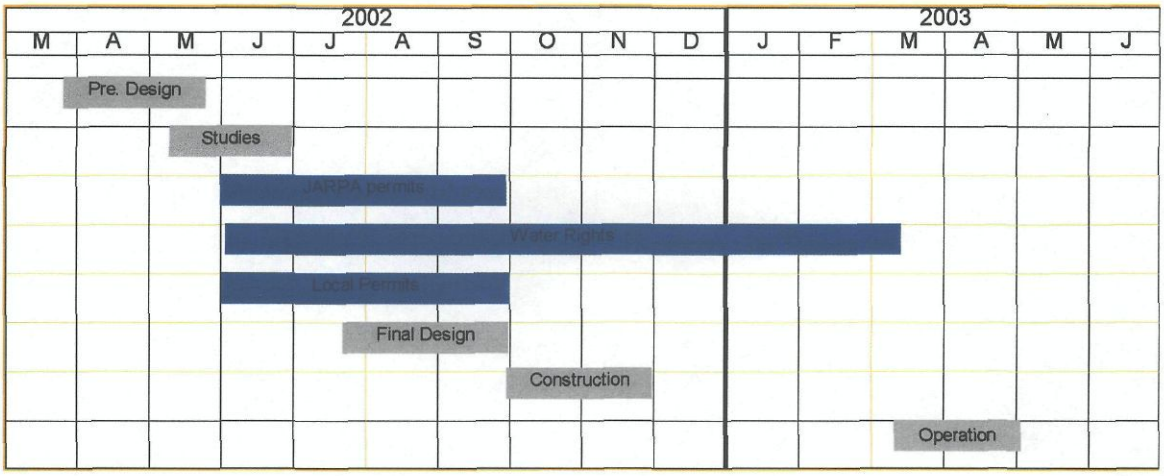
IV. PERMIT SUMMARY

A number of construction and operating permits will be required. A summary of these permits and support studies is shown in the table below:

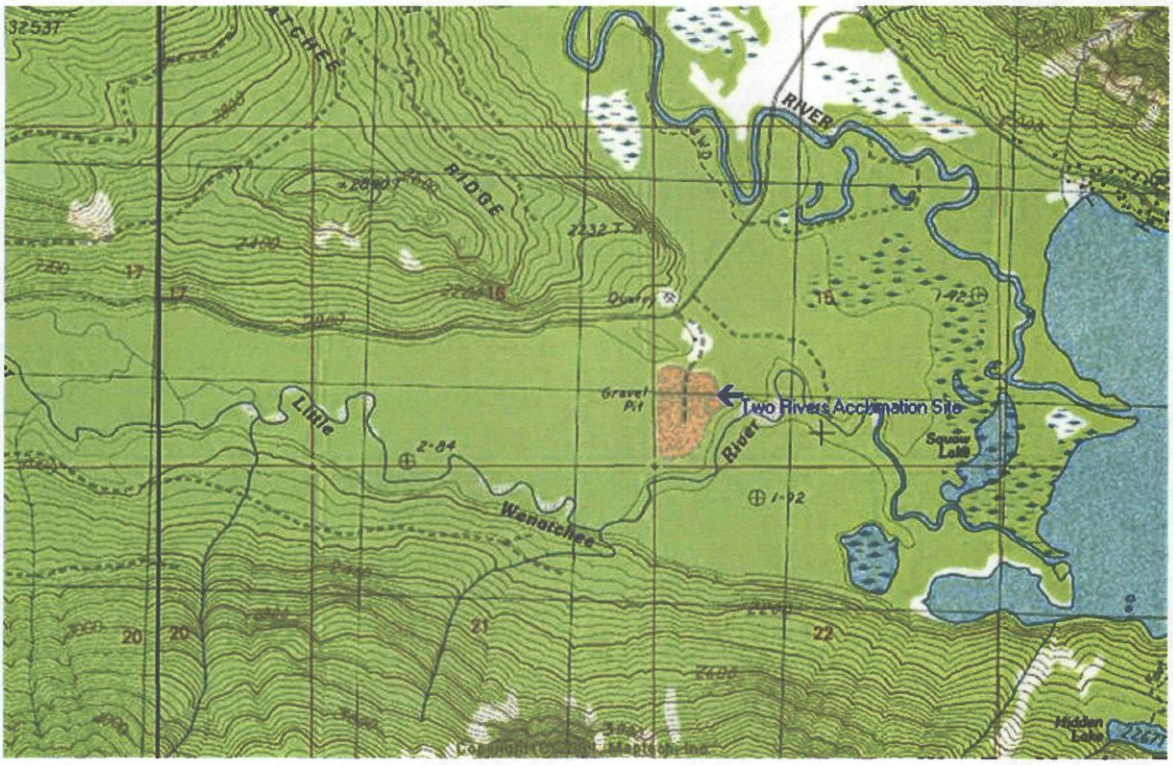
PERMIT NAME	AGENCY
JARPA - Joint Aquatic Resource Permits Application	
HPA	WDFW
SHORLINES SUBSTANTIAL DEV.	Chelan Co. Planning
FLOODPLAIN MANAGEMENT	Chelan Co. Planning
EXCEED. OF WATER QAUL. STANDARDS	WDOE
OTHER STATE PERMITS	
ARCHAEOLOGICAL EX	Ofc of Arch. & Hist. Pres.
WATER RIGHTS	WDOE
AIR QUALITY	WDOE
OTHER LOCAL PERMITS	
CONSTRUCTION	Chelan Co.
CONDITIONAL USE	Chelan Co.
FLOODPLAIN DEVELOPMENT	Chelan Co.
SEPA (OR NEPA)	
ENVIRONMENTAL CHECKLIST	Chelan Co.
EIS or DNS	Chelan Co.
BIOLOGICAL OPINION	
BIOLOGICAL ASSESSMENT	NMFS, USFWS
STUDIES REQUIRED	
Archelolgical Survey	
Environmental Land Audit	
Receiving Water Quality Study	
Elevation and Location Site Survey	

V. PROJECT DEVELOPMENT SCHEDULE

The goal is to release fish from the site by the spring of 2003.



VI. LOCATION MAP

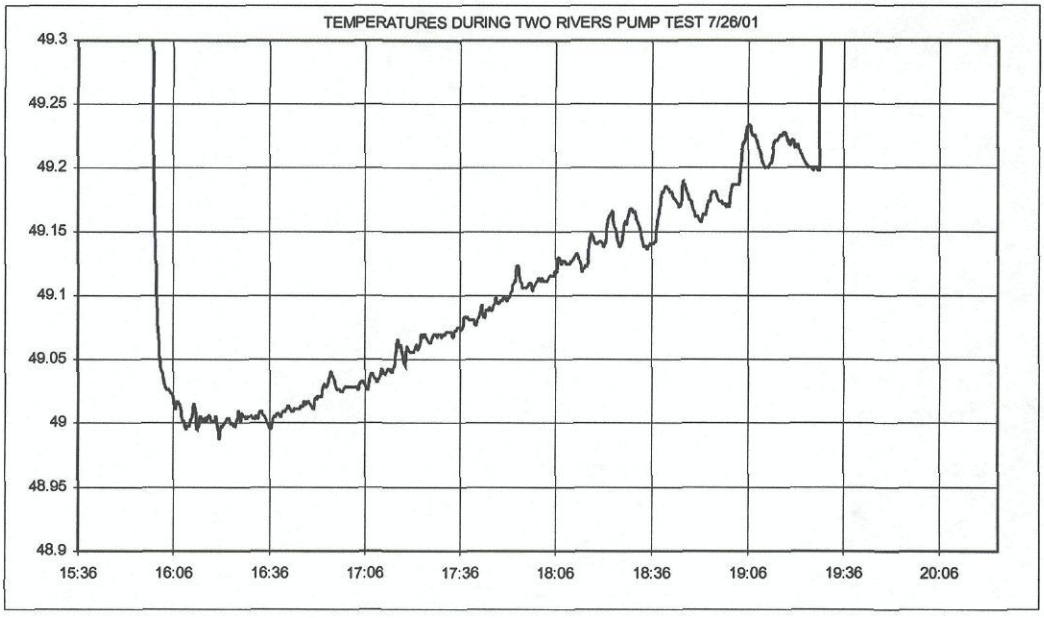


APPENDIX 1. WATER SUPPLY TESTS, EXISTING DUG WELL

1. *Water Quality Sampling*

Results

Dissolved Oxygen	4.3 ppm	Sample taken on 7/20/01 from dug well with small pump operating
Ph	7.2	Sample taken on 5/24/01 from dug well with small pump operating
Ph	7.1	Sample taken on 7/31/01 during dug well drawdown test
Hardness (CaCO3)	56	Sample taken on 5/24/01 from dug well with small pump operating
Hardness (CaCO3)	79	Sample taken on 7/31/01 during dug well drawdown test
Iron	1.2	Sample taken on 7/31/01 during dug well drawdown test
Temperature	49 F	Measurements taken on 7/26/01 during drawdown test on dug well, pumping 70 gpm
Hydrocarbon	To the limits of detection, no traces of medium to heavy oils were found (see report from Sound Analytical Services dated July 9, 2001)	



2. *Bioassay*

Exp. Design

Rear from egg to fry stage in a tank, measure growth and survival. A 12 v DC submersible pump supplies water from the existing well on site. Power is supplied by batteries.

Results: Eggs hatched successfully, rearing tests are currently underway.

3. *Well Drawdown Test*

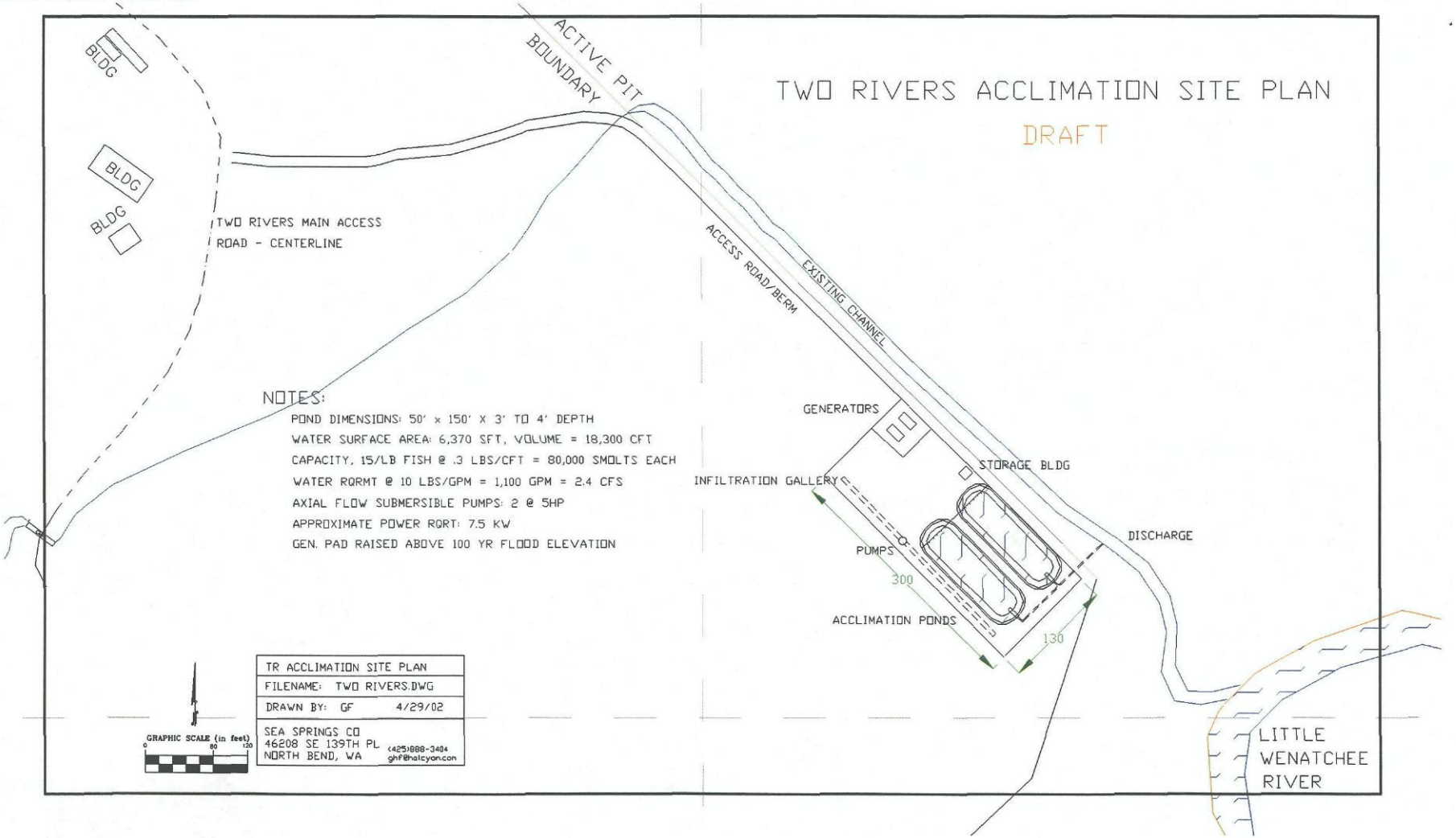
Procedure:

The existing dug well was pump tested. Drawdown and recovery rates were recorded and GeoEngineers (see Hydrogeologic Services, Aquifer Testing, Wenatchee Watershed) analyzed the data.

Results:

The conservative estimate for output from the dug well is 160 gpm. The short-term estimate for output from the pit is 17 cfs and the long-term output is 5 cfs. Constructed wells would add additional output.

A2. SITE PLANS



DRAFT ELEVATIONS

TR Site Crossections	
FILENAME: TR Site Crossections	
DRAWN BY: GF	5/26/02

SEA SPRINGS CO
46288 SE 139TH PL
NORTH BEND, WA